

Claims

1. A seal ring (1) of a mechanical face seal device for jet engines for rotation in common with an engine shaft, characterized in that it is formed of a composite material comprising a fibre-reinforced ceramic material.
2. The seal ring according to claim 1, characterized in that the reinforcing fibres are selected from a group of reinforcing fibres comprising carbon and SiC fibres.
3. The seal ring according to claim 1 or 2, characterized in that the ceramic material comprises a SiC material.
4. The seal ring according to any of the preceding claims, characterized in that the proportion of reinforcing fibre in the composite material amounts to between 45 and 65 volume %, preferably to between 50 and 60 volume %.
5. The seal ring according to any of the preceding claims, characterized in that the composite material comprises unaligned reinforcing fibres having a length of more than 5 mm, preferably of between 15 and 25 mm.
6. The seal ring according to any of the claims 1 to 4, characterized in that the composite material comprises aligned reinforcing fibres.
7. The seal ring according to any of the preceding claims, characterized in that the diameter of the reinforcing fibres amounts to less than 15 μm , preferably to between 2 and 12 μm .
8. The seal ring according to claim 6, characterized in that a fabric of reinforcing fibres is provided.

9. The seal ring according to claim 6, characterized by a fibre reinforcement which is produced by a fibre filament winding process.
10. The seal ring according to any of the claims 6 to 9, characterized in that a surface layer consisting of a fibre-reinforced SiC composite material is provided on at least one of the opposite end faces (17, 18) of the seal ring (1), whereby the reinforcing fibres in the surface layer are unaligned.
11. The seal ring according to claim 10, characterized in that the thickness of the surface layer amounts to between 0.1 and 1.0 mm, preferably 0.25 and 0.5 mm.
12. The seal ring according to any of the preceding claims, characterized in that a seal face (13) having pumping structures (20) formed therein is formed in at least one of the end faces (17, 18) of the seal ring (1) or the end face (17) provided with the surface layer.
13. A mechanical face seal device for jet engines comprising at least one pair of cooperating seal rings (1, 2), of which one is provided for non-rotational mounting on a stationary component and the other for rotation in common with an engine shaft, characterized by a pairing of materials for the seal rings (1, 2) which comprises a friction minimizing material for the non-rotational seal ring (2) and a composite material consisting of a fibre-reinforced ceramic material for the rotary seal ring (1).
14. The mechanical face seal device for jet engines according to claim 13, characterized in that the composite material is a SiC composite material reinforced with carbon or SiC fibres.
15. The mechanical face seal device for jet engines according to claim 12 or 13, characterized in that the friction-minimizing material is a carbon material.

16. The mechanical face seal device for jet engines according to any of the claims 12 to 15, characterized in that, for use in a low-pressure region of the jet engine, the composite material comprises unaligned reinforcing fibres having a length of more than 5 mm, preferably of between 15 and 25 mm.

17. The mechanical face seal device for jet engines according to any of the claims 12 to 15, characterized in that, for use in the high pressure region of the jet engine, the composite material comprises aligned reinforcing fibres.

18. The mechanical face seal device for jet engines according to claim 17, characterized in that a surface layer consisting of a fibre-reinforced SiC composite material is provided on at least that one of the opposite end faces (17, 18) of the rotary seal ring (1) on which a seal face (13) is formed, whereby the reinforcing fibres of the surface layer are unaligned.

19. The mechanical face seal device for jet engines according to any of the claims 12 to 18, characterized in that pumping structures (20) are formed in a or said seal face (13) of the rotary seal ring (1).